INFORMATION TECHNOLOGY CAREER OPPORTUNITIES WHICH PATH SHOULD I CHOOSE?

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ENDLESS OPPORTUNITIES

Robotics

Medical Devices and Equipment

Biomedical Custom Instrumentation

Signal Processing - multi dimension imagery

Automation

Research and Development

Simulation Tools

Lighting

Audio Visual Tools

Computer Aided Design

Develop and Publish Specifications

Security Systems

Architecture

Technical Writer

Software Development

AVIONICS AIRCRAFT TESTING

- Naval Rotary Wing Aircraft Test Squadron
- Avionics/Mission and sensors include the broad spectrum of mission systems and RF sensors including the Antenna Testing Laboratory Automated System, the Ship/Shore Communications and Electronics System team. The Combat and Communication Systems team designs, integrates and tests communication systems.

TYPES OF AIRCRAFT SYSTEMS TESTED

- This includes providing system engineering, integration, design, analysis, prototyping, tests, evaluation, and integrated support engineering services and products related to many aircraft systems:
- Mission computers/processors
- Radio communication
- Navigation
- Controls
- Displays
- Mission sensors
- Instruments
- Antennas

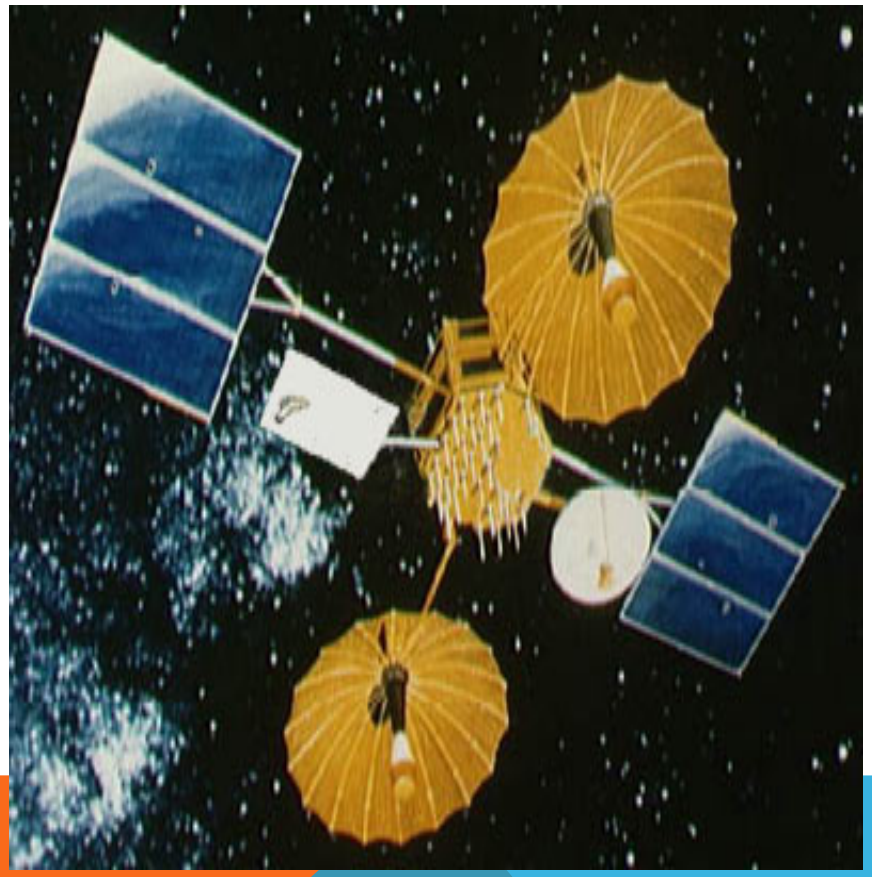
ANECHOIC CHAMBER TESTING

TRANSITION FROM AVIONICS TO SATELLITE TELECOMMUNICATIONS

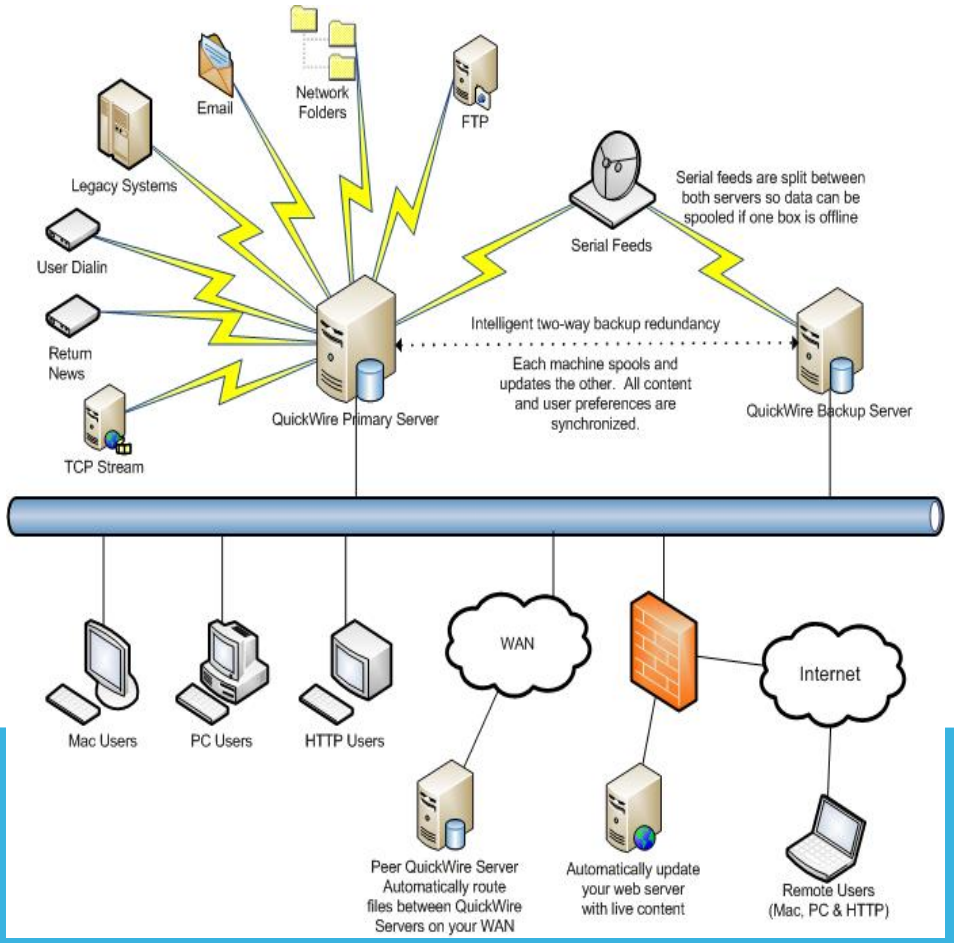
SPACE COMMUNICATIONS

- The Space Network (SN) is a data communication system comprised of a constellation of Tracking and Data Relay Satellites (TDRSs) and various ground terminal complex employing high-gain microwave antennas. The combination of elements comprising SN allows 24 hours per day support to customers including global telecommunication services for telemetry, tracking, and command between low earth orbit (LEO) spacecraft and customer control and data processing facilities.

TRANSITION FROM SATELLITE TO GROUND COMMUNICATIONS



The TDRS (Tracking & Data Relay Satellite) tracks earth-orbiting spacecraft, including the Shuttle, and transmitting their data back to Earth.



Wide Area Network Topology

NEW WAYS TO WORK

The UCC initiative offers tremendous, ground-breaking capabilities which facilitates the advancement of scientific discovery, and offers NIH Staff new ways to work:

Home Office

Global Teams

Conferences & Workshops

New Work Environments

Virtual Collaboration

Flexible Mobility

NIH NETWORK

- **NIH networks provide access to information and information management assets:**
- 45,000 end users
- across approximately 130 buildings
- **As dedicated network location growth increases, cost and network management complexity increase.**

NIH NETWORK

❑ Service Components

100Gb NIH network core with 100Gb, 40Gb, and 10Gb connections to labs and buildings on and off campus

Wireless/Cellular Network supporting 30K connections on a typical day

❑ Service Characteristics

- Reliable, highly available service 24 x 7 x 365 with scalable on-demand bandwidth
- Connects 44,000 people and more than 130 NIH facilities
- Supports thousands of teleworkers and travelers
  - 16,000 remote access connections
- 65,000+ end user devices and scientific instruments sending data across the NIH network

60 Terabytes of Data through Internet Daily
130 Terabytes of Data through Internet2 Daily
1.5 Petabytes of Data through NIH Network Core Daily

INTRAMURAL RESEARCH PROGRAM SUPPORT

Collaborations:

Biomedical engineering and instrumentation

Biomedical imaging

Clinical informatics

Computational chemistry

Computational neuroscience

Data Science

Genomics and proteomics

Mathematical modeling, statistics, and data analysis

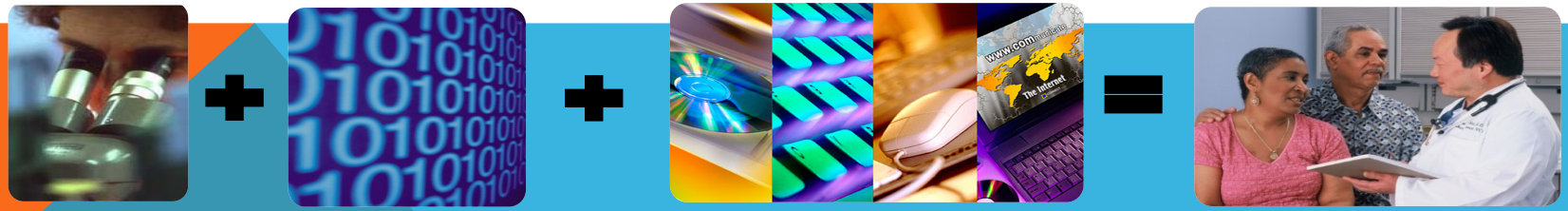
mHealth and telemedicine

Molecular modeling / quantum chemistry

Structural biology / Systems biology

Metrics:

- 62 Publications
- 237 Collaborations with 23 ICs
- 4 Patents
- 3 Cooperative Research and Development Agreement
- Continuous Technology Transfer
- Mentoring the next generation of researchers
- 4 Areas of Excellence
  - The Signal Processing and Instrumentation Section (SPIS)
  - The Imaging Sciences Laboratory (ISL)
  - The High Performance Computing and Informatics Office (HPCIO)
  - The Mathematical and Statistical Computing Laboratory (MSCL)



NIH LOCAL AREA NETWORK MANAGEMENT

- NIH manages approximately 70,000 LAN ports across all 28 Institutes and Centers.
- Center for Information Technology manages 21,682 of the ports, or 31% of NIH's Local Area Network requirements through the provisioning of Enterprise Network Services.
- Approximately 48,000 Local-Institute and Center managed ports across all the Institutes and Centers.

NETWORK DESIGN DRIVERS

- Access to scientific applications, high performance computing capabilities, and telemedicine each require NIH's scientific communities to upload and download large files in a timely manner. These applications are central to enabling biomedical and scientific research (e.g., genomics, proteomics, imagery, etc.) drive the greatest demand for network services.
- As such, network links between devices that generate biomedical/scientific data and the devices that store this data; and the links between these storage devices and other locations that need the data to perform computations require significant capacity.

CABLING INFRASTRUCTURE

Structured cabling systems provide the horizontal and vertical cable to connect end users and network devices for all voice and data requirements at the NIH.

On campus and off campus data centers

- 1600 servers
- 3.8 PB of storage capacity

Customers

- 27 ICs, OD and ORS
- Numerous HHS and other agencies

More than 18,000 miles of fiber and copper cable

850 telecommunications closets and equipment rooms

TELECOMMUNICATIONS

- **NIH Legacy Telephone Service**

–5ESS phone switch provisioning approximately 60,000 phone lines

–Call Center

- NIH hospital
  - –Code Blue service
  - –Signal Page service
- Directory look up service for the NIH and general public
- Public Health Service Commission Corp Information

NIH MODERNIZED UNIFIED COLLABORATION

Cisco Jabber Application

Headset

Cisco Phone

Microsoft Lync Application

Headset

Microsoft Polycom Phone

Microsoft Lync Application

Headset

Cisco Phone

TELECOMMUNICATIONS CONT'D.

- 911 emergency dispatch phone system
- 2-way push-to-talk radio service
  - Supports NIH Police Department emergency dispatch
  - Supports NIH Fire Department emergency dispatch
  - Supports Continuity of Operations Program
  - Supports facility maintenance operations
- NIH internal pager service

INFORMATION SECURITY IS A HIGH PRIORITY

NIH INFORMATION SECURITY FOCUS AREAS

IT Management Best Practices

Configuration Management—Patch Management—System Administration—Operations Management—Change Management

ENDLESS OPPORTUNITIES……..

QUESTIONS